

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

TITLE V (DRAFT PERMIT) NO. V-05-019

GUARDIAN AUTOMOTIVE TRIM, INC.

MOREHEAD, KY.

JANUARY 4, 2006

D. BRIAN BALLARD, REVIEWER

PLANT I.D. #: 021-205-00042

A.I. #: 3866

ACTIVITY ID #: APE20040001

APPLICATION LOG # 55741

SOURCE DESCRIPTION:

An application for a Title V permit for Guardian Automotive Trim, Incorporated was received on May 9, 2003. The Guardian facility is a major source as defined in Kentucky State Regulation 401 KAR 51:017 (40 CFR 52.21), *Prevention of Significant Deterioration (PSD) of air quality*. The potential emissions of volatile organic compounds (VOC) are in excess of 250 tons per year. The source is located in a county classified as "attainment" or "unclassified" for ozone pursuant to Regulation 401 KAR 51:010, *Attainment Status Designations*.

Operations at the facility include spray coating of plastic parts with solvent-based coatings and decorative chrome electroplating of plastic parts. There are four paint lines at the facility. The lines are High Gloss, High Bake, Low Gloss and Resist. Permanent total enclosures (PTEs) are used to capture 100% of the volatile organic compound (VOC) emissions from the lines. There are three PTEs at the facility. There is one PTE around the High Gloss line (emission unit **02**), a second PTE around the High Bake line (emission unit **14**) and a third PTE around the Low Gloss and Resist lines (emission units **03** and **12**). The captured emissions are controlled through the use of four regenerative thermal oxidizers (RTOs). The allowable overall destruction efficiency per line for VOC is 85%. Potential to emit of VOC is calculated assuming 85% destruction efficiency. Particulate Matter (PM) emissions from the paint lines are controlled through the use of water curtains and filters.

The previous facility permits are F-96-025, S-99-050 and F-00-006. Permit F-00-006 contained emission limitations for copper, nitric acid and sulfuric acid based on regulation 401 KAR 63:022 and 63:021. 401 KAR 63:021 provides that a source with conditions based on 401 KAR 63:022 shall continue to comply with all conditions based on that regulation unless it can demonstrate that a condition is no longer necessary to protect human health and the environment. The May 2003 Title V Permit application relies on AP-42, Chapter 12.20 to estimate emissions from plating operations. The emission factors and methodologies outlined in AP-42, Chapter 12.20 contain a high degree of uncertainty and it is the Division's position that they are not adequate for the purposes of demonstrating compliance with source wide emission limitations for copper, nitric acid and sulfuric acid and are not adequate for demonstrating compliance with 401 KAR 63:020 in regard to chromium VI emissions. Permit V-05-019 has testing requirements for chromium (hexavalent), copper, nitric acid and sulfuric acid. The testing must be completed within 180 days of the issuance of permit V-05-019. An air dispersion model protocol for air toxics must be submitted within 60 days of the issuance of V-05-019. The Division approved results of these tests will be used in combination with the EPA approved air dispersion model to demonstrate compliance with 401 KAR 63:020.

SOURCE DESCRIPTION:

As an alternative to testing, the source may submit engineering evaluations for the purpose of quantifying emissions of chromium VI, copper, nitric acid and sulfuric acid from plating operations. The source may elect to demonstrate compliance with 401 KAR 63:020 through a combination of testing and engineering evaluation. Any engineering evaluation for a specific pollutant and specific plating operation/scrubber control system must be submitted within 180 days of the issuance of the permit. The emission data from the engineering evaluation will be used in the approved air dispersion model for the purpose of demonstrating compliance with 401 KAR 63:020. If an engineering evaluation is found to be deficient or if the air dispersion model relying on data from the engineering evaluation show that the source is not in compliance with 401 KAR 63:020, the source shall be required to conduct a performance test for the pollutant evaluated according to a schedule prescribed by the Division.

COMMENTS:

The calculation methodology for potential emissions of VOC, volatile HAP and nonvolatile HAP per applicator from the paint lines is detailed below:

For Primers, Base Coats, Clear Coats, Resist Coats and Top Coats:

$$A \times D \times F_C \times (1 \text{ ton} / 2000 \text{ lbs}) = T$$

$$T \times \text{VOC EF} \times (1 - \text{VOC CE}) = \text{lb/hour of VOC}$$

$$T \times \text{PM EF} \times \text{TE} \times (1 - \text{PM CE}) = \text{lb/hour of PM/PM}_{10}$$

$$T \times \text{vHAP EF} \times (1 - \text{VOC CE}) = \text{lb/hour of vHAP}$$

$$T \times \text{nvHAP EF} \times \text{TE} \times (1 - \text{PM CE}) = \text{lb/hour of nvHAP}$$

$$\text{PTE (tons/year)} = (\text{lb/hour}) \times [(8760 \text{ hours}) / (2000 \text{ lb/ton})]$$

Where,

A = The maximum applicator rate in gallons per hour.

D = The maximum coating density at the applicator in lb/Gal.¹

F_C = The maximum fraction of an hour that coating is applied as defined below.

T = The maximum tons/hour of coating applied.

VOC EF = Volatile organic compound emission factor.²

PM EF = Particulate and particulate matter 10 microns or less emission factor.³

vHAP EF = Volatile hazardous air pollutant emission factor.⁴

nvHAP EF = Nonvolatile hazardous air pollutant emission factor.⁴

PM CE = Particulate matter and particulate matter 10 microns or less control efficiency.

TE = Transfer efficiency.

PTE = Potential to emit.

The Source Classification Code (SCC) is 40202201, Petroleum and Solvent Evaporation, Surface Coating Operations, Plastic Parts, Coating Operation. The SCC units are pounds per ton.

Cycle time for coating application = 34 seconds/cycle

Number of coating cycles per run period = 30

Runtime per run period = 1360 seconds/run period

$$F_C = \text{Fraction of hour coating is applied} = \frac{(34 \text{ sec/cycle})(30 \text{ cycles/run period})}{1360 \text{ sec/run period}} = 0.75$$

Note 1: The maximum coating density is specific for primer, color coats, clear coats, resist coats and top coats. The maximum coating density is based on density data for primer, base coats, clear coats, resist coats and top coats in the May 9, 2003 application.

COMMENTS (CONTINUED):

Note 2: The average paint VOC content, specific to primer, color coat, clear coat, resist coats and top coats as specified in the May 9, 2003 application is used to calculate the VOC emission factor.

Note 3: The average paint solids content, specific to primer, color coat, resist coats and top coats as specified in the May 9, 2003 application is used to calculate the PM/PM₁₀ emission factor.

Note 4: The maximum content of each individual HAP at the applicator, specific to primer, color coat, clear coat, resist coat and top coat as specified in the May, 9, 2003 application is used to calculate individual HAP emission factors.

For Purging:

$$A \times D \times [F_P + (1 - R)] \times (1 \text{ ton}/2000 \text{ lbs}) = T$$

$$T \times \text{VOC EF} \times (1 - \text{VOC CE}) = \text{lb/hour of VOC}$$

$$T \times \text{vHAP EF} \times (1 - \text{VOC CE}) = \text{lb/hour of vHAP}$$

$$\text{PTE (tons/year)} = (\text{lb/hour}) \times [(8760 \text{ hours}) / (2000 \text{ lb/ton})]$$

A = The maximum applicator rate in gallons per hour.

D = The purge density at the applicator in lb/Gal.

F_P = The maximum fraction of an hour that the purging occurs as defined below.

T = The maximum tons/hour of purging.

R = Recovery rate of purge (fraction of purge recovered per hour).

VOC EF = Volatile organic compound emission factor.

vHAP EF = Volatile hazardous air pollutant emission factor.

PTE = Potential to emit.

The SCC is 40202205, Petroleum and Solvent Evaporation, Surface Coating Operations, Plastic Parts, Equipment Cleanup. The SCC units are pounds per ton.

$$F_P = \text{Fraction of hour purging occurs} = \frac{(160 \text{ sec/cycle})(1 \text{ cycle/run period})}{1360 \text{ sec/run period}} = 0.12$$

$$R = 45\%$$

The emissions from natural gas combustion associated with the powerwash and ovens associated with the paint lines are calculated based on million standard cubic feet of natural gas burned. The emission factors for NO_x, CO and VOC are from the EPA Factor Information Retrieval (FIRE) Data System, SCC 10200603, External Combustion Boilers, Industrial, Natural Gas, less than 10 Million Btu/hr. The emission factors for PM, PM₁₀ and SO₂ are from the EPA FIRE Data System, SCC 39000689, Industrial Processes, In-process Fuel Use, Natural Gas, General.

The emissions from natural gas combustion associated with boilers are calculated based on million standard cubic feet of natural gas burned. The emission factors for CO, NO_x, Lead, SO₂, and VOC are from the EPA FIRE Data System, SCC 10200603, External Combustion Boilers, Industrial, Natural Gas, less than 10 Million Btu/hr.

The emissions from the Chrome Pre-plating tanks (EU4) and Nitric Acid Strip tanks (EU8) are calculated based on the tons of make up solution required per tank. The emission factors for Copper, Particulate Matter, Nitric Acid and Sulfuric acid will be updated using the emission factor derived from the compliance test results.

COMMENTS (CONTINUED):

The emissions from the Chrome Plating Line (EU5), Acid Copper Bath (EU6) and Nickel Plating Process (EU7) are calculated based on the 1000 Ampere hours per month used per tank. Emission factors for Chromium VI, Copper and Nickel are from the FIRE Data System and use the following SCC's: SCC 30901028, Industrial Processes, Fabricated Metal Products, Electroplating Operations, Decorative Chromium – Electroplating Tank, SCC 30901045, Industrial Processes, Fabricated Metal Products, Electroplating Operations, Copper (sulfate) – Electroplating Tank and SCC 30901068, Industrial Processes, Fabricated Metal Products, Electroplating Operations, Nickel (general) – Electroplating Tank. The emission factors for Chromium VI, Particulate Matter and Sulfuric Acid will be updated using the emission factor derived from the compliance test results.

EMISSION AND OPERATING CAPS DESCRIPTION:**401 KAR 51:017**

The permittee shall demonstrate 85% overall control of VOC emissions for each of the surface coating lines to comply with BACT requirements.

EXAMPLES OF COMPLIANCE NOTIFICATION AND NOTIFICATION PROCEDURES

The permittee has developed several different examples of the operating scenarios on each line as a means to illustrate what action would be required on the part of Guardian in reporting to the Division. Also, the examples provide insight as to how the daily calculation for compliance would be performed when the PTEs were not meeting the five-point criteria for each hour of the day. This facility is subject to the record keeping and reporting requirements in Subpart PPPP. Those requirements are not in effect at present and are not addressed in this document.

The following tables summarize events for the paint lines and paint mix rooms that would require the permittee to notify the Division of a malfunction or noncompliance situation.

As indicated earlier in Section D of the permit, Guardian is proposing to calculate capture efficiency when the five-point EPA criteria are not being met. This capture efficiency in combination with the destruction efficiency will result in the overall control efficiency.

To complete the daily compliance demonstration, Guardian is proposing to calculate the daily overall efficiency to determine compliance with the 85% limit. Some example operating scenarios and events are summarized in the following tables.

Low Gloss/Resist Lines:

Modus Pressure Differential Monitor	Daily Compliance Demonstrated	Submit Report to KYDEP
ΔP at -0.007 for all operating hours	Yes – control efficiency is 89%	Report in semi annual compliance report
ΔP 3 hour block below set point	Yes – control efficiency is above 85 %	Report in semi annual compliance report
ΔP 3 hour block below set point	No – control efficiency is below 85 %	Notify KYDEP, submit malfunction report if non compliance result of malfunction

High Gloss/High Bake Lines:

Modus Velocity Monitors	Paint Mix Room Venting to Atmosphere	Daily Compliance Demonstrated	Submit Report to KYDEP
Entrance/exit supply fan and vestibule exhaust fan achieve set point for all operating hours	No venting to atm. - 0 hrs	Yes – control efficiency is 89%	Report in semi annual compliance report
Entrance or exit supply fan or vestibule exhaust fan miss set point	No venting to atm. - 0 hrs	Yes – control efficiency is above 85%	Report in semi annual compliance report
Entrance/exit supply fan or vestibule exhaust fan miss set point	No venting to atm. - 0 hrs	No – control efficiency is 84%	Notify KYDEP, submit malfunction report to KYDEP if failure to achieve BACT result of malfunction
RTO capacity insufficient to control processes and mix rooms	Venting to atm.	Yes – control efficiency is above 85%	Submit malfunction report to KYDEP to report mix room by pass
Paint line bypass occurs and VOCs vented to atmosphere	No venting or venting occurs	Yes – control efficiency is above 85%	Submit malfunction report to KYDEP
Paint line bypass occurs and VOCs vented to atmosphere	No venting or venting occurs	No – control efficiency is below 85%	Notify KYDEP, submit malfunction report to KYDEP if failure to achieve BACT result of malfunction
RTOs operate at or above set point temperature	No venting to atmosphere	Yes – control efficiency is 89%	Report in semi annual compliance report
An RTO below set point by 28 ⁰ C for three hour block average	No venting	Yes – unit is taken off line before temperature falls below set point by 28 ⁰ C Or No – if control efficiency below 85%	Submit malfunction report to KYDEP if unit was controlling emissions from paint line at any point during 3 hour average and temperature below set point by 28 ⁰ C

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.

The Permit Statement of Basis is intended for informational purposes only and does not include any enforceable terms or condition.